TROPICAL DISTURBANCES ON THE NORTH ATLANTIC OCEAN, AUGUST 1937

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[Weather Bureau, Washington, D. C., September 1937]

Two tropical disturbances originated on the North Atlantic in August 1937. Like the first tropical cyclone of the 1937 season, that of July 29–August 2, an account of which was published in the July issue of the REVIEW, neither of these was of hurricane intensity so far as present ships' reports indicate. The first of these disturbances showed signs of forming on the day that the July–August cyclone disappeared over the St. Lawrence Valley.

Cyclone of August 2–8, 1937.—At the 8 p. m. (E. S. T.) observation of August 2 evidence pointed to the existence of a slightly disturbed condition central near 24° N., 76° W. There was squally weather in the locality of the northern Bahamas on the morning of the 3d, accompanied by a weak cyclonic circulation, and a slight depression of the barometer central east-northeast of Nassau. By 8 p. m. (E. S. T.) of the 3d the circulation had strengthened and the depression had enlarged, with northward movement. The center was then near 26½° N., 76½° W.

During the 4th the slow northward movement of the LOW continued, with the center approximately 250 miles off the northeast Florida coast. Its intensity increased only slightly during the day, but the winds, though generally light, continued squally, with local winds of force 6, the highest reported.

On the morning of the 5th the LOW with center 175 miles east of the South Carolina coast, had contracted somewhat in size, but with little or no increase in general intensity. In the afternoon, however, the American steamer *Andrea F. Luckenbach*, northbound near 34½° N., 74° W., encountered an east gale of force 8. The ship's lowest barometer, at 8 p. m., was only 29.81. The cyclonic center at that time was near 33° N., 75½° W.

During the 6th the disturbance, although continuing to be shallow, increased in wind energy, and at 2:30 a. m.—exact location within the disturbed area unknown—the American steamer *Bienville* experienced a southeast gale of force 10. The storm was centered at 8 a. m. (E. S. T.) of the 6th approximately 100 miles east of Hatteras, moving northeastward. At 8 p. m. it had reached a point about 200 miles east of the Virginia Capes, covering a small area as a closed circulation, but strengthening the winds for a considerable distance in the direction of the high-pressure area adjoining it to the eastward. At the evening observation the American ketch *Atlantis*, near 37½° N., 71° W., reported a southeast gale of force 9, increasing at 9:30 p. m. (local) to force 10.

On the morning of the 7th the center lay southeast of Nantucket, with no winds higher than force 7 reported at the regular observing hour. A special report from the Norwegian steamer *Harboe Jensen*, at 11 a. m., gave a southeast gale of force 10, barometer 29.71, at 40°12′ N., 67°54′ W. Shortly thereafter the wind on ship diminished and shifted to west-northwest. The lowest reported barometer in connection with this disturbance was 29.67, read on the American steamer *American Trader*, wind south-southwest, force 9, at 11:30 p. m. of the 7th, at 41°10′ N., 65°50′ W.

During the 8th the disturbance lost energy while passing to the east-northeastward south of Nova Scotia and had practically dissipated near Sable Island before the regular morning observation of the 9th. Its entire course was spent at sea.

As early as the 3d, the Weather Bureau forecast center at Jacksonville, Fla., issued an advisory warning of the disturbance, and further advisories regarding its energy, location, and movement, were issued up to 9:30 a. m. of the 4th. At 10 p. m. of the 5th, when the cyclone was nearly due south of Hatteras, northwest storm warnings were ordered from Washington for the coast between Cape Hatteras and the Virginia Capes, and caution advised for small vessels in the vicinity.

Cyclone of August 24–September 2, 1937.—In a report received on August 23 at the forecast center at San Juan, P. R., from Fort-de-France, Martinique, transmittal was made of a ship report indicating a disturbed area south of 18° N., in longitude 51° W. On the strength of this information, San Juan issued an advisory warning for the benefit of vessels east of the Leeward Islands. At 11 p. m. of this date the Dutch S. S. *Baarn* had an east-northeast wind of force 7, barometer 30.06, in 19°48′ N., 58°36′ W. This wind appeared to denote an intensified trade, but Lesser Antillean land reports indicated a mildly disturbed area east of the Leeward Islands.

On the 24th a depressed area, not yet established as an inclosed LOW, appeared northeast of the Leeward Islands in the morning and north of them at the evening observation, thus indicating it to have a west-northwest bearing.

During the 25th and 26th the disturbed condition, still showing immature circulation and lack of strong winds, continued to advance toward the west-northwest, and by 8 p. m. of the 26th was north of Turks Island. At 8 p. m. of the 27th it was over the eastern Bahamas, attended by winds no stronger than light to moderate squalls. During the 28th the weather continued squally as on the preceding day, though the disturbed area had widened over a region central near, but slightly north of Nassau, and with little evidence of cyclonic circulation to be observed. At a distance of nearly 200 miles to the eastward of the center, near 25½° N., 74° W., the American steamer *C. A. Canfield* reported a south-southeast wind of force 7, barometer 29.88, at 4 p. m., and near that time a maximum force of 8 from the south. Slightly to the northward, at 7 p. m., the American steamer *Colombia* reported a southeast gale, also of force 8.

On the 29th the disturbance, moving northwestward, was central at 8 p. m. off the middle east coast of Florida attended by increasingly squally weather and a slight fall in barometer. The American motorship *Matagalpa*, in 28°30′ N., 78°40′ W., reported an east-southeast gale of force 9, barometer 29.69, during a squall that was apparently of short duration. At about 10 p. m. a southeast gale of force 10—the heaviest reported by a ship in connection with the disturbance—was encountered by the American steamer *Solana*, barometer 29.75, in 28°36′ N., 78°38′ W. This ship, southbound, had heavy weather with strong to whole gales from 5 p. m. of the 29th until 2.30 a. m. of the 30th, after which the weather rapidly moderated.

At 7.30 a. m. (E. S. T.) of August 30 the center of the disturbance then turning more toward the west was near the extreme northeastern Florida coast. At that time,

near 29° to 30° N., 78° to 80° W., ships were reporting southeast winds of force 6 to 8. The highest wind reported by a vessel in east coast waters during the morning was of force 9 from the southeast, at 4.30 a. m., in 30° N., 80°15′ W., barometer 29.79.

The following description of the history of the storm as it affected the coast and mainland of Florida, is quoted from the report of Mr. Grady Norton, forecaster on duty at Jacksonville:

> The center of the storm passed inland on the east Florida coast moving in a northwesterly direction about 9 a. m. to 10 a. m. on August 30 in the vicinity of Ormond Beach, attended by gales of 50 to 60 miles per hour over a stretch of the coast extending roughly from New Smyrna to St. Augustine. The lowest pressure reported was 29.38 inches, by the Coast Guard at the northern end of Daytona Beach, though this location was probably not in the exact center and may not represent the lowest experienced.
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> No lives were lost on this stretch of coast, but considerable minor property damage occurred to communication lines and electric wires, and also to some buildings and other flimsy structures. A good many trees were blown down on wires and across highways, causing temporary delays in traffic.
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> Timely and accurate warnings doubtless resulted in considerable saving of property throughout the affected area. Small craft had been secured in safe places and low islands evacuated well in advance of the storm.
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> This storm was very small in diameter but rather intense for its size, and was remarkably persistent after passing inland. Although it gradually lost intensity, it caused some damage to power lines at Lake City, Fla., more than 100 miles from where it entered land from the Atlantic, and heavy rains and squalls persisted on through the northwestern counties of Florida causing considerable damage by flooding and washing out of roads and bridges. A maximum wind velocity of 28 miles per hour was reported from Apalachicola just after the passage of the center some distance to the north of that place.
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> The S. S. *Tarpon* sank off Panama City, Fla., with loss of possibly 15 lives. Press reports indicate that heavy squalls attending the disturbance may have been the cause, but this had not been definitely established. * * * The disturbance preserved its identity on northwestward through Alabama, Mississippi, and Arkansas.

As the storm went inland, exceptionally high tides were reported northward along the upper Florida and the Georgia coasts. In Alabama, on September 1, heavy rains over the southern part of the State caused damage to crop and other property estimated in press reports as amounting to possibly millions of dollars.

The disturbance was well covered by advisories issued at San Juan on August 23 to 25, and later by those issued at Jacksonville. Northeast storm warnings were ordered at 7.30 p. m. (E. S. T.) of the 29th northward from Vero Beach to St. Augustine, Fla., and at 3 a. m. of the 30th, from St. Augustine to Savannah.

NOTES AND REVIEWS

B. HAURWITZ. *The Physical State of the Upper Atmosphere.* Rep. from *Jour. Roy. Astron. Soc. Can.*, 1936 Oct.–1937 Feb. University of Toronto Press, 1937.

H. R. MIMNO. *The Physics of the Ionosphere. Reviews of Modern Physics*, vol. 9, pp. 1–43, 1937 Jan.

The phenomena and physical conditions in the extreme upper atmosphere have in recent years come to be of increasing interest to meteorologists; and at the present time, active investigations are in progress to determine the possible influence of some of these phenomena on meteorological conditions in the lower atmosphere. The literature of the subject is extensive and rapidly growing.

The series of articles by Haurwitz is a general summary of present knowledge of the outer atmosphere, with 121 bibliographic references. Among the topics discussed are optical phenomena of the high atmosphere, nacreous and noctilucent clouds, meteor phenomena, the light from the night sky, ionization in the upper atmosphere and its role in the propagation of electromagnetic waves and in the diurnal variations of terrestrial magnetism, the aurora, atmospheric ozone, anomalous propagation of sound in the atmosphere, and the chemical composition of the air at high levels.

The paper by Mimno is a technical discussion of observational facts and physical theories relating to the propagation of radio waves and the state of the ionized regions, and their relations to other geophysical phenomena, with over 300 references to the literature.—*Edgar W. Woolard.*

BIBLIOGRAPHY

[RICHMOND T. ZOCH, in charge of Library]

By AMY D. PUTNAM

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

Ackeret, J.

High-speed wind tunnels. Washington. November 1936. 22 p. figs., diagrs. 26½ cm. (U. S. National advisory committee for aeronautics. Technical memorandum. No. 808.)

The blizzard men of 1888. An account of the annual meeting and luncheon of March 12, 1936, New York City, and some historical references. Newark, N. J. 1937. [12] p. 23 cm.

Ertel, Hans.

Zusammenhang von Luftdruckänderungen und Singularitäten des Impulsdichtefeldes. Berlin. 1936. 12 p. figs. 26 cm. [Sonderausgabe aus den Sitzungsberichten der Preuss. Akademie der Wissenschaften, Phys.-Math. Klasse, 1936. XX.]

Great Britain. Meteorological office.

Averages of bright sunshine for the British Isles for periods ending 1935. London. 1936. 43 p. tables. 24½ cm. (M. O. 408.)

Hannay, Mrs. Annie Murray, comp.

The influence of weather on crops; 1900–1930; a selected and annotated bibliography. Wash., D. C. 1931. 246 p. 23½ cm. (U. S. Dept. of agric. Miscell. pubn. no. 118.) Contribution from Bureau of agricultural economics.

Hoover, William H.

The dependence of carbon dioxide assimilation in a higher plant on wave length of radiation. Wash., D. C. 1937. 13 p. pls., diagrs. 24½ cm. (Smithsonian miscellaneous collections. v. 95, no. 21.) Publication 3406.

International commission for synoptic weather information.

Report of the tenth meeting, Warsaw, Sept. 5, 6, & 10, 1935, and of the joint meetings with the Climatology commission at Warsaw, Sept. 6 and 10, 1935. Leyde. 1936. 144 p. figs., tables. 24½ cm. (no. 31.)